

FCR 13

Office of the President
September 12, 2025

Members, Board of Trustees:

PATENT ASSIGNMENT REPORT

Recommendation: that the Board of Trustees accept the patent assignment report for the period April 1, 2025 to June 30, 2025.

Background: At its March 1997 meeting, the Board of Trustees authorized the University of Kentucky Research Foundation to conduct all future copyright and patent filings and prosecutions. Quarterly reports on patent and copyright applications are to be submitted to the Finance Committee of the Board.

Action taken: ☒ Approved ☐ Disapproved ☐ Other _____

PATENT ASSIGNMENTS
FOR THE PERIOD April 1, 2025 TO June 30, 2025

Patents

The following assignments on behalf of the Board of Trustees of the University of Kentucky Research Foundation have been executed:

1. **U.S. Patent Application Number:** 19/119,272
UKRFID: 2711
Filed: April 8, 2025
Title: COMPOUNDS WITH ANTI-ACINETOBACTER BAUMANNII ACTIVITY
Inventors: Sylvie Garneau-Tsodikova (College of Pharmacy)
Description and Application: This invention is novel aromatic hydrazide and monohydrazide compounds specifically designed to combat *Acinetobacter baumannii* (Ab), a highly drug-resistant bacterium that causes severe nosocomial infections. The disclosed compounds demonstrate potent activity against various Ab strains, including multidrug-resistant isolates, while exhibiting no significant mammalian cytotoxicity or hemolysis. These new compounds also effectively inhibit Ab growth in liquid cultures and biofilms, and crucially, Ab has not developed resistance to them even after multiple passages. The global market for *Acinetobacter baumannii* infection treatment is estimated to reach \$471 million by 2030, with a projected compound annual growth rate (CAGR) of 6%.
License: NA
2. **U.S. Patent Application Number:** 19/179,478
UKRFID: 2709
Filed: April 15, 2025
Title: A METHOD FOR SYNTHESIS OF CATHODE MATERIALS FROM BLACK MASS
Inventors: Jian Shi, Yuxuan Zhang, Ahamed Ullah, Ning Wei (Martin-Gatton College of Agriculture, Food and Environment), Xin Gao and Qing Shao (Pigman College of Engineering)
Description and Application: The invention is a novel method to synthesize nickel-manganese-cobalt (NMC) cathode materials directly from spent lithium-ion battery "black mass." The process employs hydrophobic deep eutectic solvents (hDESs) to leach critical metals

like lithium, cobalt, nickel and manganese from the black mass. A precipitant separates the NMC salts, allowing for lithium recovery and hDES recycling. The method then adjusts the metal ratios in the precipitated salts, creating a precursor formulation for direct synthesis into high-performance cathode materials through thermal treatment. This approach offers significant environmental benefits by avoiding hazardous acid waste, reducing energy consumption, and enabling closed-loop battery manufacturing. The global lithium-ion battery recycling market is an estimated \$7.4 billion in 2023, with a projected CAGR of 23.9% from 2023 to 2032.

License: NA

3. U.S. Patent Application Number: 19/182,166

UKRFID: 2769

Filed: April 17, 2025

Title: ADSORPTIVE MEMBRANES FOR RECOVERY OF LITHIUM AND SOLAR-DRIVEN RECYCLING OF WATER FROM GEOTHERMAL BRINES

Inventors: Rick Honaker and Mostafa Khodakarami (Pigman College of Engineering)

Description and Application: The invention is novel adsorptive membranes to efficiently recover lithium from geothermal brines and simultaneously recycle water using solar energy. The membranes feature ultralight, three-dimensional polymeric platforms with pores functionalized with crown ether derivatives that selectively bind lithium ions over other metal ions. Some embodiments integrate photothermal agents into the membrane surface, which enhances solar evaporation and lithium adsorption. This technology aims to provide a greener, more efficient alternative to current evaporative concentration methods, significantly reducing the environmental impact of lithium extraction. The global lithium extraction market was an estimated \$15.2 billion in 2023, with a projected CAGR of 12.3% from 2024 to 2030.

License: NA

4. U.S. Patent Application Number: 19/184,664

UKRFID: 2765

Filed: April 21, 2025

Title: ELECTRICALLY-CONDUCTING POLYMER YARN AND METHOD OF MAKING SAME

Inventors: Matthew Weisenberger and Ruben Sarabia Riquelme (Center for Applied Energy Research)

Description and Application: This invention is a method for creating electrically conducting polymer yarn directly from intrinsically conductive polymer fiber nonwovens or multifilament tows. The process involves simultaneously drawing and axially twisting the starting material, often wetting it with a compacting solvent to enhance density and strength. This approach yields yarns with significantly higher electrical conductivity than traditional coated textiles, making them ideal for electronic and smart textile applications. The method also outlines a process for continuous fabrication of PEDOT:PSS nonwoven mesh, a key starting material, which exhibits advantageous fusion points at fiber touchpoints, increasing robustness. The global e-textiles market size was an estimated \$3.73 billion in 2024, with a projected CAGR of 7.7% from 2024 to 2034.

License: NA

5. U.S. Patent Application Number: 19/187,644

UKRFID: 2787

Filed: April 23, 2025

Title: THORACOSTOMY TUBE WITH INTERNAL BALLOON AND EXTERNAL BOLSTER

Inventors: Brittany Levy and Jennifer Castle (College of Medicine)

Description and Application: This invention is a thoracostomy tube designed for draining air, blood or fluid from a patient's thoracic cavity. The tube integrates an inflatable internal balloon and an adjustable external bolster, which cooperatively secure the tube, prevent accidental dislodgement, and maintain the tube's sentinel apertures within the chest cavity. This design also minimizes tube movement relative to the chest wall, thereby reducing the risk of bacterial infection. The external bolster's face may also feature an antimicrobial coating for added protection. The global thoracic drainage devices market was an estimated \$688 million in 2022, with a projected CAGR of 5.3% from 2022 to 2032.

License: NA

6. U.S. Patent Application Number: 19/189,074

UKRFID: 2255

Filed: April 24, 2025

Title: HEAT-INTEGRATED TRANSFORMATIVE CARBON DIOXIDE CAPTURE PROCESS

Inventors: Kunlei Liu, Jesse Thompson, Amanda Warriner, Zhen Fang and Heather Nikolic (Pigman College Engineering)

Description and Application: This invention is a novel apparatus and method for heat-integrated carbon dioxide capture from acid gas streams. The invention features an absorber tower with a discretized packing arrangement, using structured packing segments with varying specific surface areas to optimize the temperature profile and enhance reaction rates. This strategic packing design effectively shifts the temperature bulge, maximizing the absorber column's efficiency and allowing for a smaller, more cost-effective system. Additionally, the method incorporates short sections of random packing as built-in redistributors, further minimizing column height and improving liquid-gas distribution. The global carbon capture, utilization and storage (CCUS) market is projected to reach \$9.6 billion by 2029, growing at a CAGR of 23.1%.

License: NA

7. **U.S. Patent Application Number:** 19/124,751

UKRFID: 2526

Filed: April 25, 2025

Title: RNA INTERFERENCE (RNAi) FOR CONTROL OF JAPANESE BEETLE

Inventors: Subba Reddy Palli and Ramesh Dhadapani (Martin-Gatton College of Agriculture, Food and Environment)

Description and Application: This invention is an RNA interference (RNAi)-based method for controlling Japanese beetle populations. The invention contains inactivated bacteria or nanoparticles engineered to express double-stranded RNA (dsRNA) that targets a lethal gene in the Japanese beetle, such as the Actin gene. When Japanese beetles ingest these compositions, the dsRNA silences the target gene, leading to beetle mortality, protecting plants from damage. This environmentally friendly approach offers a sustainable alternative to chemical pesticides, which face increasing resistance issues and environmental concerns. The global biopesticides market was an estimated \$7.4 billion in 2023, with a projected CAGR of 15.6% from 2024 to 2030.

License: NA

8. **U.S. Patent Application Number:** 19/193,548
UKRFID: 2773
Filed: April 29, 2025
Title: RAPID ESTIMATION OF INTERMOLECULAR ELECTRONIC COUPLING AND CHARGE-CARRIER MOBILITY OF ORGANIC MOLECULES THROUGH A MACHINE-LEARNING PIPELINE
Inventors: Chad Risko and Vinayak Bhat (College of Arts and Sciences)
Description and Application: This invention is a novel machine learning pipeline to rapidly predict the intermolecular electronic coupling and charge-carrier mobility of organic molecules. Researchers developed a graph neural network (SphereNet) that processes 3D molecular geometries as graph representations, significantly accelerating the estimation of these crucial optoelectronic properties from hours using traditional DFT methods to mere seconds. The model, trained on a vast dataset of over 438,000 DFT-derived electronic couplings, enables high-throughput screening of organic molecular crystal structures for their suitability in organic semiconductors and other optoelectronic applications. This advancement streamlines the design and discovery of new organic semiconductor materials. The global organic electronics market was an estimated \$105 billion in 2023 and is projected to grow at a CAGR of 23.8% from 2024 to 2030.
License: N/A
9. **U.S. Patent Application Number:** 19/233,228
UKRFID: 2267
Filed: June 10, 2025
Title: MACROPHAGE-DERIVED ENGINEERED VESICLES FOR TARGETED DELIVERY AND TREATMENT
Inventors: Christopher Richards (College of Arts and Sciences) and Jill Kolesar (formerly College of Pharmacy)
Description and Application: This patent application describes innovative macrophage-derived engineered vesicles (MEVs) for targeted drug delivery and modulating macrophage phenotype. Researchers developed methods for creating MEVs from specific macrophage types, allowing them to encapsulate various cargos like chemotherapeutics or genetic material. These MEVs can then

specifically target cells or macrophages in a desired environment, reprogramming their inflammatory state (e.g., M1 to M2 or vice versa) to treat conditions like cancer, traumatic injury or inflammatory diseases. This technology offers a promising solution for precise cellular targeting and personalized medicine, overcoming limitations of traditional delivery systems and endogenous vesicles. The global drug delivery systems market reached an estimated \$46 billion in 2024, with a projected CAGR of 5.9% from 2024 to 2030.

License: N/A

10. U.S. Patent Application Number: 19/239,527

UKRFID: 2754

Filed: June 16, 2025

Title: METHODS FOR MITIGATING THE EFFECTS OF LOW-LEVEL BLASTS THROUGH PHOSPHODIESTERASE-5 INHIBITION

Inventors: William Brad Hubbard (College of Medicine)

Description and Application: This invention is a novel method for mitigating the adverse effects of low-level blast (LLB) exposure, particularly mild traumatic brain injury (TBI), by administering a phosphodiesterase-5 (PDE5) inhibitor to affected subjects. The invention demonstrates that PDE5 inhibitors, such as sildenafil, can protect against neurological deficits, restore vascular integrity in the brain and improve cognitive function following blast exposure. The treatment works by enhancing brain capillary respiration, mitochondrial biogenesis, and maintaining astrocyte and tight junction protein levels. This approach offers a therapeutic strategy to address the insidious, long-term consequences of LLBs often experienced by military personnel. The global traumatic brain injury treatment market was an estimated \$2.6 billion in 2023, with a projected CAGR of 5.9% from 2024 to 2030.

License: N/A

11. U.S. Patent Application Number: 19/140,685

UKRFID: 2694

Filed: June 18, 2025

Title: BACTERIAL TYPE IV SECRETION SYSTEMS, METHODS OF USE FOR IN VIVO DNA DELIVERY, AND METHOD OF ENGINEERING

Inventors: Carrie Shaffer and Prashant Damke (College of Pharmacy)

Description and Application: This invention is a novel method for highly targeted *in vivo* DNA delivery using engineered *Helicobacter pylori* cag Type IV Secretion System (cag T4SS). Researchers have transformed this naturally occurring bacterial nanomachine, uniquely found in *H. pylori*, into a versatile tool capable of transferring large DNA fragments from avirulent bacteria directly into host cells, particularly those in mucosal tissues like the stomach. This innovation enables applications such as developing mucosal vaccines by delivering DNA-encoded antigens (e.g., COVID-19 spike protein), facilitating *in vivo* gene editing for cancer treatment (e.g., modifying gastric tumors to enhance chemotherapy) and delivering therapeutic proteins. The system offers advantages including pharmacological control and the ability to eradicate the bacterial delivery system after use. The global gene delivery technologies market was \$4 billion in 2024 and is projected to grow at a CAGR of 9.2% through 2029.

License: NA

12. U.S. Patent Application Number: 19/244,910

UKRFID: 2816

Filed: June 20, 2025

Title: MAN-TO-MACHINE INTERFACE TOWARD AUTOMATED ELECTROCHEMISTRY EXPERIMENTS

Inventors: Chad Risko, David Eaton, Aman Kaur, Rebekah Duke, Siamak Mahmoudi (College of Arts and Sciences) and Asmund Vego (Center for Applied Energy Research)

Description and Application: This invention is a novel software and hardware system designed to automate electrochemistry experiments, particularly cyclic voltammetry (CV). ExpFlow allows chemists to program experiments through an intuitive graphical interface, which then translates these procedures into precise robotic actions. The system automates tasks like reagent handling, stirring, heating and data collection, while also systematically capturing and analyzing crucial metadata, ensuring machine-readability and high data quality. This automation significantly enhances experimental efficiency and reproducibility, enabling extensive data collection for big data analysis and machine learning in chemistry. The global laboratory automation market reached an estimated \$5.9 billion in 2023, with a projected CAGR of 8.2% from 2024 to 2030.

License: N/A

- 13. U.S. Patent Application Number:** 19/244,820
UKRFID: 2850
Filed: June 20, 2025
Title: MAKING PROGRAMMED CELL-DERIVED VESICLES
Inventors: Christopher Richards (College of Arts and Sciences) and Jill Kolesar (formerly College of Pharmacy)
Description and Application: This patent application describes novel cell-derived vesicles (CDVs) engineered for targeted therapeutic delivery and immunomodulation. Researchers developed methods to create these programmed CDVs by fragmenting donor cell membranes, often macrophages, to produce vesicles displaying specific ligands or derived from particular organelles. These engineered CDVs can precisely target specific cell types, notably re-polarizing anti-inflammatory M2 macrophages to a proinflammatory M1 phenotype, which is highly beneficial for cancer therapy. The technology overcomes limitations of traditional exosomes and liposomes by offering high production yields, enhanced targeting specificity and potent immunomodulatory capabilities, with applications in developing advanced cancer treatments and other targeted therapies. The global extracellular vesicle (EV) market, which includes CDVs, was estimated \$307 million in 2023 and is projected to grow at a CAGR of 32.8% from 2024 to 2030.
License: N/A
- 14. U.S. Patent Application Number:** 19/249,380
UKRFID: 2278
Filed: June 25, 2025
Title: ACCELERATOR PRE-PROCESSOR FOR BACKUP CLIENTS
Inventors: Ray Hyatt (Information Technology Services)
Description and Application: This patent application describes a novel accelerator pre-processor for backup clients, which significantly optimizes data backup operations in large-scale computing environments, including high-performance computing (HPC) systems. The system efficiently analyzes vast and complex file systems using depth-restricted searches, generates optimized backup jobs based on factors like criticality and historical performance, and dynamically adjusts schedules to maximize resource utilization. This innovative approach enhances backup efficiency, reduces backup times from

days to hours, and improves data transfer rates by leveraging multiple network paths, thereby solving critical challenges in traditional backup methods. The global data backup and recovery market size was estimated at \$12.55 billion in 2024 and is projected to grow at a CAGR of 10.6% from 2024 to 2029.

License: N/A

15. International Application Number: PCT/US2025/25196

UKRFID: 2888

Filed: April 17, 2025

Title: ULTRA-COMPACT, SELF-POWERED DC SUPPLY WITH SURGE VOLTAGE MITIGATION WITHIN ELECTRIC MACHINES

Inventors: Jiangbiao He and Majid Tahmasbi Fard (formerly Pigman College of Engineering)

Description and Application: The invention is a novel ultra-compact, self-powered DC supply integrated directly within electric motors, addressing the critical need for onboard power and surge voltage mitigation. The system cleverly draws low-frequency AC power components from the motor's stator coil, rectifies them into DC, and can then stabilize this DC voltage using a DC/DC converter. Simultaneously, a high-pass filter shunts damaging high-frequency voltage spikes around the stator coil, safeguarding motor insulation. This innovative solution eliminates the need for bulky external power supplies and significantly extends motor lifespan by effectively suppressing transient overvoltage, particularly crucial in modern motor drives employing fast-switching wide bandgap semiconductors. The global electric motors market size was an estimated \$136.5 billion in 2024 and is projected to grow at a CAGR of 6.1% from 2024 to 2032.

License: N/A

16. International Application Number: PCT/US2025/26024

UKRFID: 2797

Filed: April 23, 2025

Title: KDM3A INHIBITORS FOR TREATING COLON CANCER AND PROSTATE CANCER

Inventors: Chunming Liu, H. Peter Spielman, Vitaliy Sviripa, Wen Zhang (College of Medicine) and David Watt (formerly College of Medicine)

Description and Application: This patent application introduces novel KDM3A inhibitor compounds as effective agents to treat various cancers, particularly colon and prostate cancers. These compounds, including specific formulations like CBA-2 and CBA-3, directly inhibit cancer cell proliferation by increasing histone H3 lysine 9 dimethylation, which in turn suppresses Wnt signaling pathways crucial for tumor growth. The invention demonstrates the compounds' efficacy, even against castration-resistant prostate cancer (CRPC) and those expressing the AR-V7 variant, a common mechanism of resistance to existing therapies like enzalutamide. These compounds enhance the therapeutic effect of existing androgen receptor signaling inhibitors, offering a synergistic treatment approach. The global cancer therapeutics market was an estimated \$187.6 billion in 2024 and is projected to grow at a CAGR of 12.8% from 2024 to 2030.

License: N/A

17. International Application Number: PCT/US2025/27097

UKRFID: 2886

Filed: April 30, 2025

Title: GENERATION OF TOLEROGENIC ORGANS USING NORMOTHERMIC or HYPOTHERMIC PERFUSION PUMP WITH TREG CELL BASED IMMUNOTHERAPY WITH OR WITHOUT STEM

Inventors: Roberto Gedaly and Francesc Marti (College of Medicine)

Description and Application: This patent application describes an innovative method to create tolerogenic organs for transplantation, aiming to reduce or eliminate the need for lifelong immunosuppressant drugs. The process involves perfusing donor organs (e.g., liver, kidney, heart) with a solution containing regulatory T cells (Treg cells), optionally combined with stem cells, using a normothermic or hypothermic perfusion pump. This infusion promotes Treg cell infiltration, shifting the organ's microenvironment towards tolerance and improving transplant success. The method also includes robust molecular, histological and cytological analyses to monitor and confirm the organ's tolerogenic state. The global organ transplantation market was an estimated \$15.6 billion in 2024 and is projected to grow at a CAGR of 9.2% from 2024 to 2030.

License: N/A

18. International Application Number: PCT/US2025/31354

UKRFID: 2394

Filed: May 29, 2025

Title: GUT MICROBIOME-DERIVED METABOLITE(S) PROMOTE SKELETAL MUSCLE ADAPTATION TO EXERCISE

Inventors: John McCarthy, Yuan Wen, Benjamin Burke and Taylor Rees Valentino (College of Medicine)

Description and Application: The invention is a novel approach to treat atrophied muscle tissue by leveraging the gut microbiome. The invention proposes administering either a cecal microbial transplant from an exercise-trained individual or specific microbial-derived metabolites (exerkines) like succinate and pipecolic acid directly to a subject. These "exerkines" effectively prevent muscle atrophy and preserve muscle function, even in the absence of exercise, by improving cellular energetics and ribosomal integrity. This groundbreaking research identifies a new class of "exercise mimetics," offering a therapeutic avenue for muscle-related conditions. The global gut microbiome therapeutics market was an estimated \$350 million in 2023 and is projected to grow at a CAGR of 32.5% from 2024 to 2030.

License: N/A

19. Foreign Patent Application Number: CN 202380073026.6

UKRFID: 2654

Filed: April 15, 2025

Title: THIOL ISOMERASES INHIBITORS; PREPARATION THEREOF; AND METHODS OF USE THEREOF

Inventors: Sylvie Garneau-Tsodikova (College of Pharmacy) and Daniel Kennedy (Western New England University)

Description and Application: This invention introduces novel thiol isomerase inhibitors and their use in treating cancer and thrombosis. These compounds, derived from zafirlukast, target extracellular thiol isomerases like PDI, ERp5, ERp57 and ERp72, which play crucial roles in both cancer progression and blood clot formation. The invention offers a dual-action therapeutic approach, simultaneously inhibiting tumor growth and preventing dangerous blood clots often associated with cancer, without increasing bleeding risk. This technology aims to overcome limitations of current anticoagulant therapies that do not address both arterial and venous thrombosis effectively. The global cancer therapeutics market was an estimated

\$207.6 billion in 2023 and is projected to grow at a CAGR of 12.2% from 2024 to 2030.

License: NA

Patent Activities
Fiscal Year to Date as of June 30, 2025

Total FY2024-25					
	FY25Q1	FY25Q2	FY25Q3	FY25Q4	Total FY25
Invention Disclosures ⁱ	22	30	37	29	118
Full Patent Applications ⁱⁱ	15	7	22	19	63
Provisional Patent Applications ⁱⁱⁱ	28 ¹	17	24 ²	22	91
Patents Issued	11	30	14	6	61
License Income	\$427,185.01	\$572,731.30	\$905,046.77	\$318,024.05	\$2,222,987.13
New Licenses and Options Executed	38 ³	15	24	14	91
New UK Startups Formed	1	0	0	0	1

¹ Capture of Collaborator filed application.

² Capture of Collaborator filed application.

³ Reclassification of Agreements.

Patent Activities
FY2023-24

Total FY2023-24					
	FY24Q1	FY24Q2	FY24Q3	FY24Q4	Total FY24
Invention Disclosures	24	34	49	35	142
Full Patent Applications	22	16	14	20	72
Provisional Patent Applications	18	15	25	20	78
Patents Issued	11	13	8	11	43
License Income	\$446,360.22	\$3,380,740.08	\$332,705.97	\$186,954.53	\$4,346,760.80
New Licenses and Options Executed	13	17	14	22	66
New UK Startups Formed	2	3	0	2	7

Patent Application Summary Table

Inventors	College(s)	Title	Brief description
Biomedical (College of Medicine and College of Pharmacy)			
Sylvie Garneau-Tsodikova	College of Pharmacy	Compounds with anti-acinetobacter baumannii activity	Novel hydrazide and monohydrazide compounds designed to combat <i>Acinetobacter baumannii</i> .
Brittany Levy and Jennifer Castle	College of Medicine	Thoracostomy tube with internal balloon and external bolster	A thoracostomy tube to drain air, blood or fluid from a patient's thoracic cavity.
William Hubbard	College of Medicine	Methods for mitigating the effects of low-level blasts through phosphodiesterase-5 inhibition	A novel method to mitigate the adverse effects of low-level blast exposure.
Carrie Shaffer and Prashant Damke	College of Pharmacy	Bacterial type iv secretion systems, methods of use for <i>in vivo</i> DNA delivery, and method of engineering	A novel method for highly targeted <i>in vivo</i> DNA delivery using engineered <i>Helicobacter pylori</i> cag Type IV Secretion System.
Chunming Liu, H. Peter Spielman, Vitaliy Sviripa, Wen Zhang and David Watt	College of Medicine	KDM3A inhibitors for treating colon cancer and prostate cancer	Novel KDM3A inhibitor compounds as effective agents to treat various cancers.

Inventors	College(s)	Title	Brief description
Roberto Gedaly and Francesc Marti	College of Medicine	Generation of tolerogenic organs using normothermic or hypothermic perfusion pump with Treg cell based immunotherapy with or without stem	An innovative method to create tolerogenic organs for transplantation.
John McCarthy, Yuan Wen, Benjamin Burke and Taylor Rees Valentino	College of Medicine	Gut microbiome-derived metabolite(s) promote skeletal muscle adaptation to exercise	A novel approach to treat atrophied muscle tissue by leveraging the gut microbiome.
Sylvie Garneau-Tsodikova	College of Pharmacy	Thiol isomerases inhibitors; preparation thereof; and methods of use thereof	Novel thiol isomerase inhibitors to treat cancer and thrombosis
Pigman College of Engineering			
Rick Honaker and Mostafa Khodakarami	College of Engineering	Adsorptive membranes for recovery of lithium and solar-driven recycling of water from geothermal brines	Novel adsorptive membranes to efficiently recover lithium from geothermal brines and simultaneously recycling water using solar energy.

Inventors	College(s)	Title	Brief description
Kunlei Liu, Jesse Thompson, Amanda Warriner, Zhen Fang and Heather Nikolic	College of Engineering	Heat-integrated transformative carbon dioxide capture process	A novel apparatus for heat-integrated carbon dioxide capture from acid gas streams.
Jiangbiao He and Majid Tahmasbi Fard	College of Engineering	Ultra-compact, self-powered dc supply with surge voltage mitigation within electric machines	A novel ultra-compact, self-powered DC supply integrated directly within electric motors.
College of Arts and Sciences			
Chad Risko and Vinayak Bhat	College of Arts and Sciences	Rapid estimation of intermolecular electronic coupling and charge-carrier mobility of organic molecules through a machine-learning pipeline	A novel machine learning pipeline to rapidly predict the intermolecular electronic coupling and charge-carrier mobility of organic molecules.
Christopher Richards and Jill Kolesar	College of Arts and Sciences	Macrophage-derived engineered vesicles for targeted delivery and treatment	Innovative macrophage-derived engineered vesicles for targeted drug delivery and modulating macrophage phenotype.

Inventors	College(s)	Title	Brief description
Chad Risko, David Eaton, Aman Kaur, Rebekah Duke, Siamak Mahmoudi and Asmund Vego	College of Arts and Sciences	Man-to-machine interface toward automated electrochemistry experiments	A novel software and hardware system designed for automating electrochemistry experiments.
Christopher Richards and Jill Kolesar	College of Arts and Sciences	Making programmed cell- derived vesicles	Novel cell-derived vesicles engineered for targeted therapeutic delivery and immunomodulation.
Martin-Gatton College of Agriculture, Food and Environment			
Jian Shi, Yuxuan Zhang, Ahamed Ullah, Ning Wei, Xin Gao and Qing Shao	CAFE	A method for synthesis of cathode materials from black mass	A novel method for synthesizing nickel-manganese-cobalt cathode materials directly from spent lithium- ion battery "black mass."
Subba Reddy Palli and Ramesh Dhadapani	CAFE	RNA interference (RNAi) for control of Japanese beetle	An RNA interference (RNAi)-based method to control Japanese beetle populations.
Center for Applied Energy Research			
Matthew Weisenberger and Ruben Sarabia Riquelme	CAER	Electrically conducting polymer yarn and method of making same	A method to create electrically conducting polymer yarn directly from intrinsically conductive polymer fiber nonwovens or multifilament tows.

Inventors	College(s)	Title	Brief description
Information Technology Services			
Ray Hyatt	ITS	Accelerator pre-processor for backup clients	A novel accelerator pre-processor for backup clients.

ⁱ Invention disclosures include new technologies and intellectual property disclosed to the Office of Technology Commercialization (OTC) that do not fall under an existing technology number. This number captures the potential new intellectual property disclosed to OTC.

ⁱⁱ Full patent applications, as used by OTC, include nonprovisional patent application filings at the United States Patent and Trademark Office (USPTO), Patent Cooperation Treaty filings, and foreign patent application filings. These are technologies that are assigned to the University of Kentucky that OTC has identified to invest further into in an effort to obtain patent protection and are described in more detail in the patent assignment section above.

ⁱⁱⁱ Provisional patent applications are legal documents filed at the USPTO that establish a filing date and protect the owner from anticipated publication of the technology, but do not mature into an issued patent unless the applicant files a full patent application within one year. Although owned by the University of Kentucky, the provisional patent applications are not included in the patent assignment descriptions as they will not mature into full patent applications without further action and investment.